

21. An electronic apparatus device according to claim 10; wherein the guide member is fixed to a position offset from a center of rotation of the movable member.

ADDITIONAL FEES:

A check in the amount of \$18.00 is enclosed to cover the cost of 1 claim in excess of 20 total. Should the check prove insufficient for any reason, authorization is hereby given to charge any such deficiency to our Deposit Account No. 01-0268.

REMARKS

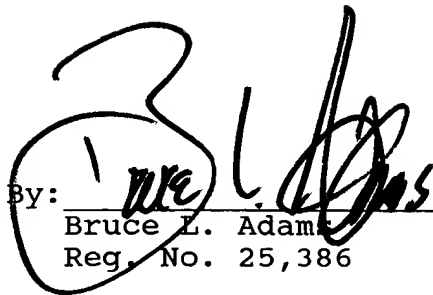
In order to place this application in condition for a complete action on the merits, the specification has been suitably revised to correct informalities and place it in better conformance with U.S. practice. Claims 1-6 have been amended in formal respects to correct informalities and improve the wording. New claims 7-21 have been added to provide a fuller scope of coverage.

A marked-up version of the changes made to the specification and claims by the current amendment is attached hereto under the heading "**VERSION WITH MARKINGS TO SHOWN CHANGES MADE.**"

Early and favorable action on the merits are most respectfully requested.

Respectfully submitted,

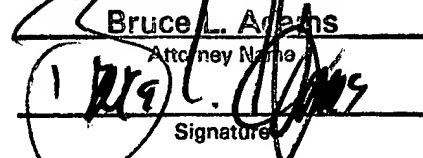
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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Paragraph beginning at line 7 of page 1 has been amended as follows:

In recent years, [in] electronic apparatus[,] having positioning control for positioning of a movable object or member has been [is] an increasingly important technology and higher positioning accuracy has been required [is requested]. As a method of carrying out positioning control of a movable object or member, there is generally adopted a method of detecting position information of a moving member moved by a drive force of an actuator and controlling movement of the moving member by feedback control based on the position information to thereby position the movable [object] member moving in cooperation with the moving member.

Paragraph beginning at line 19 of page 2 has been amended as follows:

However, according to the conventional electronic apparatus having position detecting apparatus, when the member to be read and the movable [object] member are attached to the rotating shaft, the rotating shaft is fixed to a hole portion of the member to be read by screwing or striking.

Accordingly, there poses a problem that although positions of attaching the both members are determined in a radius direction, by the rotating shaft as a guide, a positional relationship of the slit constituting the reference of the member to be read and the movable object member is shifted in a peripheral direction. When the positional relationship is shifted, it is difficult to detect the absolute position information of the movable [object] member, as a result, regardless of the fact that the moving member is accurately positioned based on the information of the member to be read, the movable [object] member is positioned to a position different from a desired position. An amount of the shift of the positional relationship between the slit constituting the reference of the member to read and the movable [object] member, is dispersed also among products.

Paragraph beginning at line 13 of page 3 has been amended as follows:

In order to eliminate the shift of the positional relationship between the slit constituting the reference of the member to be read and the movable [object] member in the peripheral direction, the positional relationship between the slit constituting the reference of the member to be read and the movable [object] member must be adjusted. The adjustment

is carried out by taking time by a skilled worker and therefore, it is difficult to adjust the positional relationship simply. Therefore, a number of steps of adjusting and the like is increased and fabrication cost is also increased. Therefore, the method is not a method suitable for mass production.

Paragraph beginning at line 1 of page 4 has been amended as follows:

Hence, it is an object of the invention to eliminate a deviation in a positional relationship in a peripheral direction between a slit constituting a reference of a member to be read and a movable [object] member when the member to be read and the movable [object] member are attached to a moving member of, for example, a rotating shaft or the like, dispense with adjustment of the shift in the positional relationship therebetween, promote mass production performance and promote positional accuracy of the movable [object] member.

Paragraph beginning at line 10 of page 4 has been amended as follows:

In order to resolve the above-described problem, according to an aspect of the invention, there is provided an electronic apparatus having a position detecting apparatus,

the electronic apparatus comprising a movable [object] member having various functions, an actuator having a moving member moved to drive the movable [object] member, a member to be read for providing information with regard to a [state of moving] position of the movable [object] member, and a guide member for fixing the movable [object] member, the actuator and the member to be read. The aspect of the invention is characterized in that the member to be read and the movable [object] member are attached by the same guide member, or the member to read and the movable [object] member are integrally formed such that a positional relationship between a slit constituting a reference of the member to be read and the movable [object] member is not shifted.

Paragraph beginning at line 24 of page 4 has been amended as follows:

By fixing the movable [object] member and the member to be read by the guide member, the shift in the positional relationship between the slit constituting the reference of the member to be read and the movable [object] member is eliminated, further, adjustment of positions of attaching the both members is dispensed with, mass production performance is promoted and the dispersion in the positional relationship between the slit constituting the reference of the member to be read and the movable [object] member can be reduced.

Paragraph beginning at line 15 of page 5 has been amended as follows:

Fig. 3 is an outline sectional view of explaining a constitution of an electronic apparatus having a moving member, a member to be read and a movable [object] member according to a conventional example;

Paragraph beginning at line 7 of page 9 has been amended as follows:

Two pieces of guide members 4 are fitted to the rotor 51 operating as the moving member 60 moved to rotate at locations of the upper face deviated from the center of rotation. The guide members 4 are rotated along with the rotor 51 and therefore, it is preferable to take an equal angular interval therebetween at equal distances from the center. There is provided a stepped difference portion lower than the central portion by one step at the upper face of the rotor 51. The member to be read 2 is arranged at the stepped difference portion. At this occasion, guide holes 2c are perforated such that the guide member 4 can be fitted to the member to be read 2. The member to be read 2 is perforated with slits 2a at equal intervals to constitute equal angles in view from the center of rotation as shown by, for example, Fig. 5. Further, the member to be read 2 is also perforated

with a slit 2b of a reference position for indicating one turn. As shown by Fig. 1, for example, the guide holes 2c of the member to be read 2 are fitted to the guide member 4, further, guide members 4 is fitted to a movable [object] member 6 fixed to the rotor 51 and rotating along with the rotor 51. As the movable [object] member 6, there is, for example, a mirror or the like. In the following, an explanation will mainly be given of a case of using a mirror. The mirror 6 is also provided with guides holes 6a similar to those of the member to be read 2 and the guide holes 6a of the mirror 6 are fitted to the guide members 4. At this occasion, the guide holes 2c and 6a are provided to the member to be read 2 and the mirror 6 such that the slit 2b constituting the reference of the member to be read 2 and the mirror 6 are brought into a predetermined positional relationship.

Paragraph beginning at line 11 of page 11 has been amended as follows:

An explanation will be given of Embodiment 2 in reference to Fig. 6. Embodiment 2 is characterized in that a rotating shaft 5a operating as a moving member, a member to be read 5b and an indicator 5c constituting a movable [object] member are integrally formed.

Paragraph beginning at line 16 of page 11 has been amended as follows:

In Fig. 6, the rotating shaft 5a operating as a moving member is molded integrally with the indicator 5c constituting the movable [object] member to be read 5b by injection molding of plastic. Although a lower portion of the rotating shaft 5a is omitted, the lower portion may be constructed by an actuator such as an ultrasonic motor for driving to rotate the rotating shaft 5a or a power transmission mechanism by gears for transmitting power of a drive source. As detecting means 8 for detecting rotation, the light emitting element 8a and the light receiving element 8b are provided to sandwich the member to be read 5b.

Paragraph beginning at line 16 of page 12 has been amended as follows:

Embodiment 3 of Fig. 7 is constituted by the motor 16 constituting a drive source, a rotating shaft 9 of the motor constituting a moving member, the member to be read 2 attached to the rotating shaft 9, an indicator 27 constituting a movable [object] member attached to the rotating shaft 9, a guide member 9a formed integrally with the rotating shaft 9 and the detecting means 8 having the light emitting element 8a and the light receiving element 8b provided to sandwich the member to be read 2.

Paragraph beginning at line 7 of page 14 has been amended as follows:

Embodiment of Fig. 8 is constituted by the motor 16 constituting a drive source, the rotating shaft 100 of the motor 16 constituting the moving member, the member to be read 2 attached to the rotating shaft 100, the indicator 27 constituting the movable [object] member attached to the member to be read 2, a guide member 2e formed integrally with the member to be read 2 and the light emitting element 8a and the light receiving element 8b provided to sandwich the member to be read 2.

Paragraph beginning at line 14 of page 15 has been amended as follows:

The ultrasonic motor is constituted by the vibrator 12 constituted by adhering the piezoelectric element 11 to a lower face of an elastic member, the projections 13 provided at the upper face of the vibrator 12, the rotor 51 arranged to be brought into contact with the projection 13, the center shaft 14 fixed with the vibrator 12 for enabling [to rotate] rotation of the rotor 51 and the pressurizing spring 15 for pressing the rotor 51. According to the ultrasonic motor, a drive signal is applied to the piezoelectric element 11 to thereby oscillate the vibrator 12, the oscillation is converted into rotational movement by friction between the

projections 13 and the rotor 51 to thereby rotate the rotor 51. In this case, the rotor 51 operates as the moving member.

Paragraph beginning at line 2 of page 16 has been amended as follows:

In this case, the movable [object] member is constituted by an eccentric cam 23 and guide members 23a are integrally formed therewith at locations deviated from the center of rotation of the eccentric cam 23. The guide members 23a penetrate the guide holes 2c of the member to be read 2 and are driven into the rotor 51. An urge spring 18 is connected to one end face of a straight moving base 19 and urges the straight moving base 19 to a side of the eccentric cam 23 in contact with other end face of the straight moving base 19. The straight moving base 19 is provided with a multilayered film filter 20. An input port 21 of an optical fiber and an output port 22 of an optical fiber are arranged to sandwich the multilayered film filter 20.

Paragraph beginning at line 16 of page 17 has been amended as follows:

An explanation will be given of Embodiment 6 in reference to Fig. 10. Fig. 10 shows a constitution of a variable attenuator for adjusting an optical amount of light, which is constituted by the rotating shaft 100 rotated by

drive force of the actuator 16 and constituting a moving member, a member to be read 40a fitted to the rotating shaft 100, slits 40aa at equal intervals as well as a slit 40ab constituting a reference formed by an etching process, an optical amount adjusting slit 40b constituting a movable [object] member formed integrally with the member to be read 40a by the etching process, an optical fiber input port 21 and an optical fiber output port 22 provided to sandwich the optical amount adjusting slit 40b and the detecting means 8 having the light emitting element 8a and the light receiving element 8b provided to sandwich the member to be read 2.

Paragraph beginning at line 16 of page 19 has been amended as follows:

Fig. 11 is an outline sectional view for explaining a constitution in which drive force of the ultrasonic motor is transmitted to a rotating shaft 41a constituting a movable member via a transmission mechanism 25 to thereby move the indicator 27 constituting the movable [object] member moved in cooperation with the rotating shaft 41a.

IN THE CLAIMS:

Claims 1-6 have been amended as follows:

1. (Amended) An electronic apparatus comprising: a movable member [having a position detecting movably driven to

perform a given function; a position detecting device for detecting the position of the movable member; [apparatus, the electronic apparatus comprising: a movable object member having various functions;] an actuator having a moving member movably driven [moved] to drive the movable [object] member; a readable member [to be read] for providing location information [with regard to a state] of [moving] the movable [object] member; and a guide member for holding [fixing] the movable [object] member, the actuator and the readable member [to be read] in a fixed orientation with respect to each other.

2. (Amended) An [The] electronic apparatus [having a position detecting apparatus] according to claim 1; [:] wherein a sectional shape of the guide member is non-circular.

3. (Amended) An [The] electronic apparatus [having a position detecting apparatus] according to claim 1; [:] wherein the guide member is formed integrally with at least one of the moving member, the readable member [to be read] and the movable [object] member.

4. (Amended) An [The] electronic apparatus [having a position detecting apparatus] according to claim 1; [:] wherein at least two of the movable [object] member, the moving member and the readable member [to be read] are integrally formed.

5. (Amended) An [The] electronic apparatus [having a position detecting apparatus] according to claim 1; [:] wherein the movable member is mounted to undergo rotary motion, and the guide member is fixed to a position offset [different] from a center of rotation of [rotating] the movable [object] member.

6. (Amended) An [The] electronic apparatus [having a position detecting apparatus] according to claim 1; [:] wherein the actuator is an ultrasonic motor.